

Madison Gas and Electric Company

Customer Driven Design of Smart Grid Capabilities

Abstract

The Madison Gas and Electric Company's (MGE) Customer Driven Design of Smart Grid Capabilities project involves the installation of advanced metering infrastructure (AMI), deployment of a new distribution management system, and installation of electric vehicle charging stations. These activities help improve efficiency, reliability, and service for MGE customers. Within MGE's service territory, all medium to large-size commercial and industrial customers, and randomly selected residential and small business customers, are receiving advanced meters. A cellular communications system remotely relays customer energy use data to MGE, where upgraded software uses this data for billing and other operational needs. MGE is installing a new distribution management software platform, which improves analysis capabilities and overall system reliability. Under a pilot project, MGE is also installing 18 electric vehicle-charging stations to study the impact of electric vehicle use on the grid and home-based energy demand.

Smart Grid Features

Communications infrastructure includes the installation of a new distribution management system (DMS), new communications data servers, and a cellular system for advanced meter communications. MGE is deploying a new software platform for distribution grid management, which coordinates monitoring, analysis, and control of distribution. The outage management system, metering infrastructure, and supervisory data control acquisition system are being integrated into the DMS with new software interfaces. MGE expects improved outage avoidance, disturbance response time, and distribution planning capabilities from the new DMS, resulting in overall improved system reliability. New smart meters installed in the project have integrated cellular communications devices to automatically relay meter data, in real-time, to grid operators.

Advanced metering infrastructure includes deployment of 4,500 advanced meters across MGE's service territory. All 3,550 medium- to large-size commercial and industrial customers receive advanced meters, while a representative random sample of 950 residential and small business customers are selected for advanced meter installation. In addition to automatic meter reading, customers receive enhanced outage response and notification and improved tamper and theft detection. With the meters' more detailed and timely data, MGE is able to improve load forecasting, capital investment planning, and energy use information for customers.

Electric vehicle charging stations are being deployed to provide convenient charging capabilities for plug-in electric vehicles. The deployment includes 18 charging stations. These stations provide tracking and analysis of electric vehicle charging patterns and a base of experience for MGE with the operational demands placed by the electric vehicles on the

At-A-Glance

Recipient: Madison Gas and Electric Company

State: Wisconsin

NERC Region: ReliabilityFirst Corporation

Total Budget: \$11,101,881

Federal Share: \$5,550,941

Project Type: Advanced Metering Infrastructure
Electric Distribution Systems

Equipment

- 4,500 Smart Meters
- AMI Communication Systems
 - Meter Communications Network
- Distribution Management Systems
- 18 Electric Vehicle Charging Stations

Targeted Benefits

- Improved Electric Service Reliability
- Reduced Operating and Maintenance Costs

Madison Gas and Electric Company *(continued)*

grid. MGE then expects to use this experience to further understand the feasibility of rate-based programs for electric vehicle charging. For example, a pricing program could provide incentives for vehicle charging at off-peak times thus limiting the grid impacts.

Timeline

Key Milestones	Target Dates
AMI deployment start	Q4 2010
AMI deployment complete	Q1 2012
Electric vehicle charging station installation complete	Q3 2012
Distribution management system deployment complete	Q4 2013

Contact Information

Pete Waldron
Vice President and Operations Officer
Madison Gas and Electric Company
PWaldron@mge.com

Recipient Team Website: www.mge.com